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RESEARCH ARTICLE

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SYNTHESIS AND COORDINATION PROPERTY STUDY OF SCHIFF-BASE COMPOUNDS CONTAINING 1, 2, 4-TRIAZOLE AS SUBUNITS

Chenyang Li, Meiling Xian, Siwei Hua and Jun Zhang*

Laboratory of Environmental Monitoring, School of Tropical and Laboratory Medicine, Hainan Medical University, Haikou, 571199, China

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ABSTRACT

Two schiff bases containing 1, 2, 4-triazole as subunits were synthesized in high yields. Their coordination properties were characterized by UV-vis spectra, and the results showed that the active groups on the subunit had great effect on the coordination properties of Schiff bases.

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INTRODUCTION

1, 2, 4-Triazole based derivatives composed an important class of organic compounds with diverse agricultural, industrial and biological activities (Streeter *et al.*, 1973; Mejía, 2010; Lu *et al.*, 2015) including anti-microbial (Hasan *et al.*, 2011), anti-convulsant (Shcherbyna *et al.*, 2017) and anti-inflammatory properties (Shcherbyna, 2017). Especially, the good coordination property of compound containing 1, 2, 4-triazole (Zhao *et al.*, 1996), made the synthesis of these heterocycles receive considerable attention in recent years (Li *et al.*, 2015; Wang *et al.*, 2020; Zhang *et al.*, 2012). In this work, two Schiff base compounds bearing 1, 2, 4-triazole as subunits were synthesized and characterized. The synthesis route was shown in Scheme 1.

Experimental Section

Reagents and Instruments: All reagents are commercially analytical grade reagents.

*Corresponding author: Jun Zhang,

Laboratory of Environmental Monitoring, School of Tropical and Laboratory Medicine, Hainan Medical University, Haikou, 571199, China.

MS were got on a Thermo TSQ Quantum Access Agilent 1100 system. UV-Vis spectra were carried on a Hitachi U-2910 spectrophotometric. Nuclear magnetic resonance (NMR) spectra were obtained with a Bruker AV 400 instrument and chemical shifts are given in ppm from tetramethylsilane (TMS).

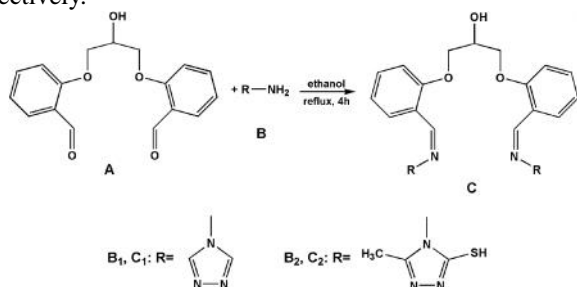
Synthesis of Compounds B

Compound A and B₂ were synthesized as reported methods (Zhao *et al.*, 1996; Zhang *et al.*, 2008). Compound A (1.0 mmol) and B (1.1 mmol) were mixed and stirred under reflux for 4 h in ethanol (40 mL), and then the reaction mixture cooled to room temperature, the white precipitate so obtained was filtered and dried in vacuum. The product was used directly. C₁: Yields 86.7%. MS m/z: 431.14 (M+H)⁺. C₂: Yields 85.3%. MS m/z: 523.64 (M+H)⁺.

RESULTS AND DISCUSSION

Two Schiff base compounds containing 1, 2, 4-triazole were obtained in high yields. The mass spectrum supported the formation of the compounds. Peaks at m/z 431.14 and 523.64

was assigned to the $(C_1+H^+)^+$ and $(C_2+H^+)^+$ molecular ions, respectively.



Scheme 1 Synthesis route of B

As we all know, 1, 2, 4-triazole derivatives had good coordination property, $C_{1,2}$ as host compounds were studied by UV-vis method (Figure 1-2). The tested metal ions were K^+ , Na^+ , Ca^{2+} , Mg^{2+} , Zn^{2+} , Pb^{2+} , Co^{2+} , Cd^{2+} , Cu^{2+} , Fe^{2+} , Cr^{3+} , Ni^{2+} , Hg^{2+} , Cu^{2+} , Al^{3+} and Ag^+ . From the result we can know that C_1 has better sensitivity towards Cu^{2+} than C_2 , and the addition of Hg^{2+} caused a blue shift of C_1 and red shift of C_2 , respectively. Especially, C_1 showed good sensitivity to Ag^+ . All these results proved that $-SH$ in compound C_1 played important roles in the coordination process. This results were consistent with the hard and soft acid-base theory, compounds containing S showed good sensitivity to Hg^{2+} and Ag^+ ions.

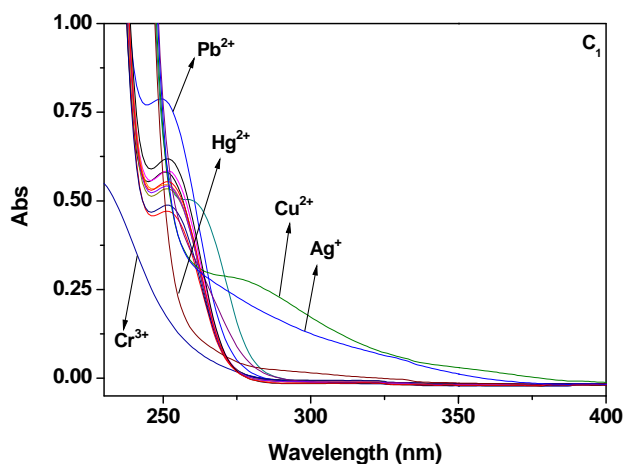


Figure 1 UV-vis spectra of C_1 with tested metal ions in ethanol.

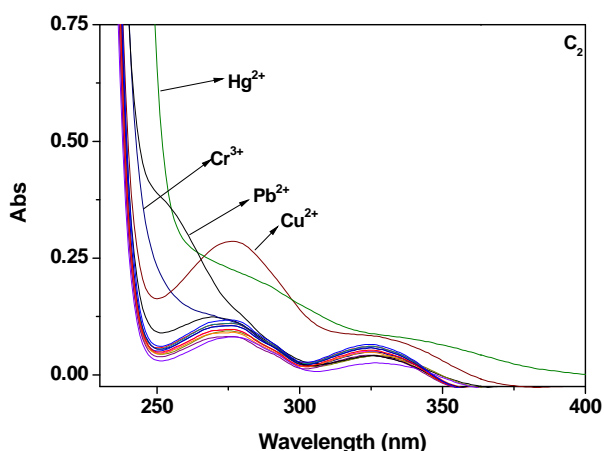


Figure 2. UV-vis spectra of C_2 with tested metal ions in ethanol

Conclusion

In summary, two new compounds containing 1, 2, 4-triazole as subunits were synthesized, the study showed that active group had great effect on the coordination property of these

compounds. We believe that this study will significantly promote the design and synthesis of effective host compounds.

Acknowledgements

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